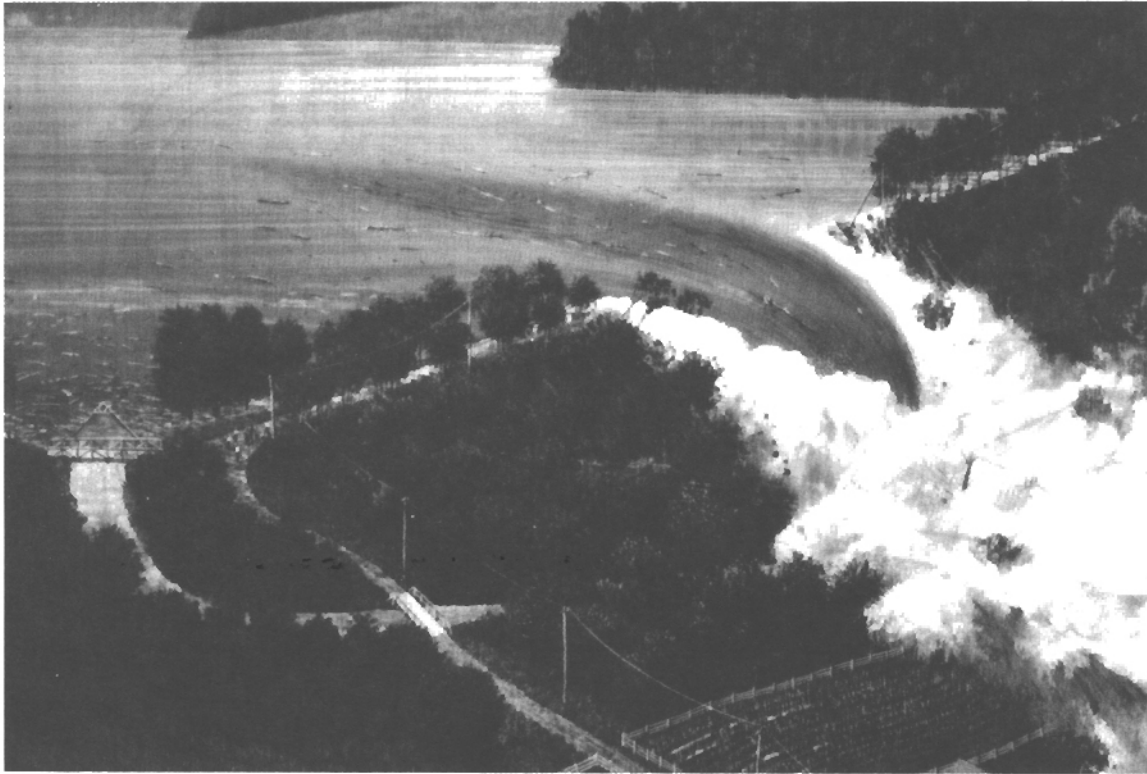


# The South Fork Dam

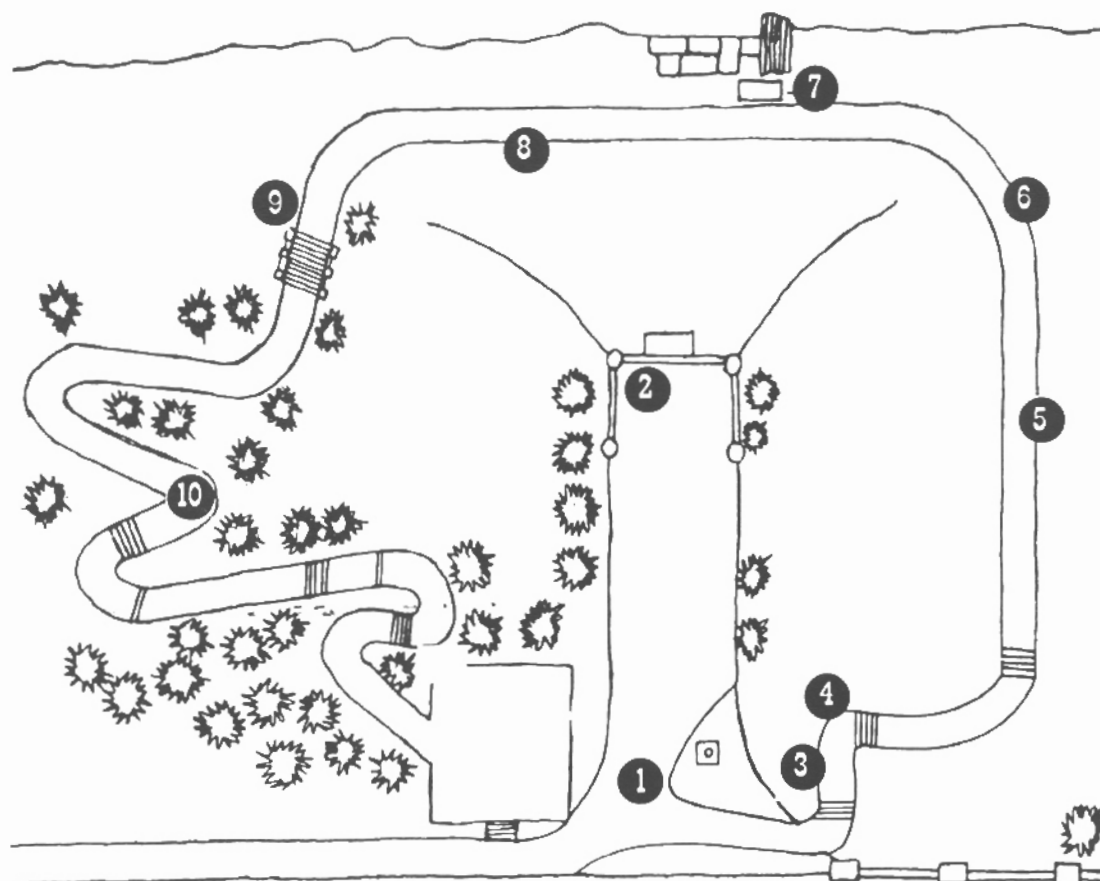


A Guided Walk  
through the Ruins



# Welcome to the South Abutment Trail of Johnstown Flood National Memorial

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The numbered stakes you will see along the trail correspond with the numbered paragraphs in this booklet. To enjoy the trail fully, we suggest you start at Station **1**.

We ask that you "take only pictures, and leave only footprints."

# Onto the Dam

1 Italian immigrants with picks and shovels dug at the earth here in a desperate attempt to save the dam. If the dam were to collapse, they would be swept to their deaths. These men had been hired that spring to dig a sewer system for the South Fork Fishing & Hunting Club. They had been sleeping in tents in the nearby woods the night that the biggest storm of the century hit. The next morning they were pressed into



service in a last, heroic effort to prevent one of the worst disasters in American history.

2 John G. Parkē, Jr., had just graduated from the University of Pennsylvania with a degree in civil engineering. His first job after graduation was to design a sewer system for a resort owned by rich Pittsburgh businessmen. On the morning of May 31, 1889 he found himself on horseback galloping back and forth across their dam in the wind and rain. He ordered the men on the dam to work where he thought they could do the most good. But he feared that a disaster of monstrous proportions was unfolding before them.



# Into the Lakebed

**3** You are at the approximate level of Lake Conemaugh on May 30, 1889. Notice that it is only a matter of feet to the top of the dam. On the morning of May 31 the lake was rising a foot an hour, while the storm continued to rage on. Everyone there knew that if the water began to flow over the top, the dam would break. Any earthen dam—no matter how well built—will break if water is allowed to flow over the top.

As you look across the stream to the opposite hillside, you can see a heavy



timber bridge, which we have reconstructed over the spillway. The only means of letting out the excess water was the spillway—and the spillway was hopelessly jammed with debris.



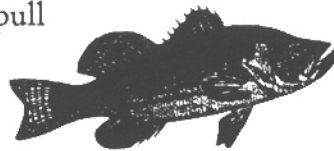
**4** The hillside above the spillway looks much the same as it did in 1889. It was the farm of Colonel Elias J. Unger, the last president of the South Fork Fishing & Hunting Club. Mr. Unger had retired from the hotel business in Pittsburgh to the little farm above Lake Conemaugh. He awoke at 6 a.m. on May 31, but the nightmare was just beginning. He looked out the window and was startled by what he saw. He said, "It looked as though the whole valley were under water." He put on his gum coat and ran down to the dam.



5 You are now at the bottom of Lake Conemaugh. This spot was once under as much as 65 feet of water. In the summer of 1881, the South Fork Fishing & Hunting Club stocked the

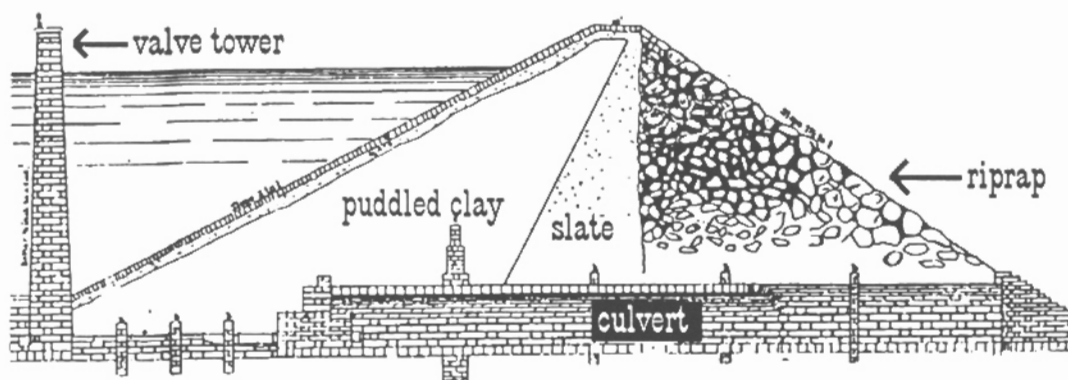
lake with 1,000 black bass, which had been transported by special railroad tank car from Lake Erie at a cost of about a dollar a fish.

6 Colonel Unger and his men at the spillway struggled to pull out an iron screen, but it was so jammed with debris that it wouldn't budge.



The screen had been attached to the spillway bridge years before to keep the fish from escaping from the lake.

# Through the Breach



7 The original dam, which was built by the State of Pennsylvania and completed in the 1850's, had a control mechanism consisting of a **sluice** gate with five very large cast iron pipes covered by a stone **culvert** extending 270 feet through the base of the dam. The foundation stones you see are all that remain of the culvert. A valve tower out in the lake regulated the flow of water out through the pipes. After a **breach** in 1862, the lake was completely **drained**, the valve tower burned down, and the cast iron pipes were sold. The property was purchased by the South Fork Fishing & Hunting Club in 1879. The dam was reconstructed by **them**, but this vital control

system was never replaced. The only way left to get rid of the excess water was the spillway—and on the morning of May 31, 1889, it was clogged.

The level of the lake continued to rise at an alarming rate. It was just a matter of time before the water would flow over the top, which would cause any earthen dam to break.

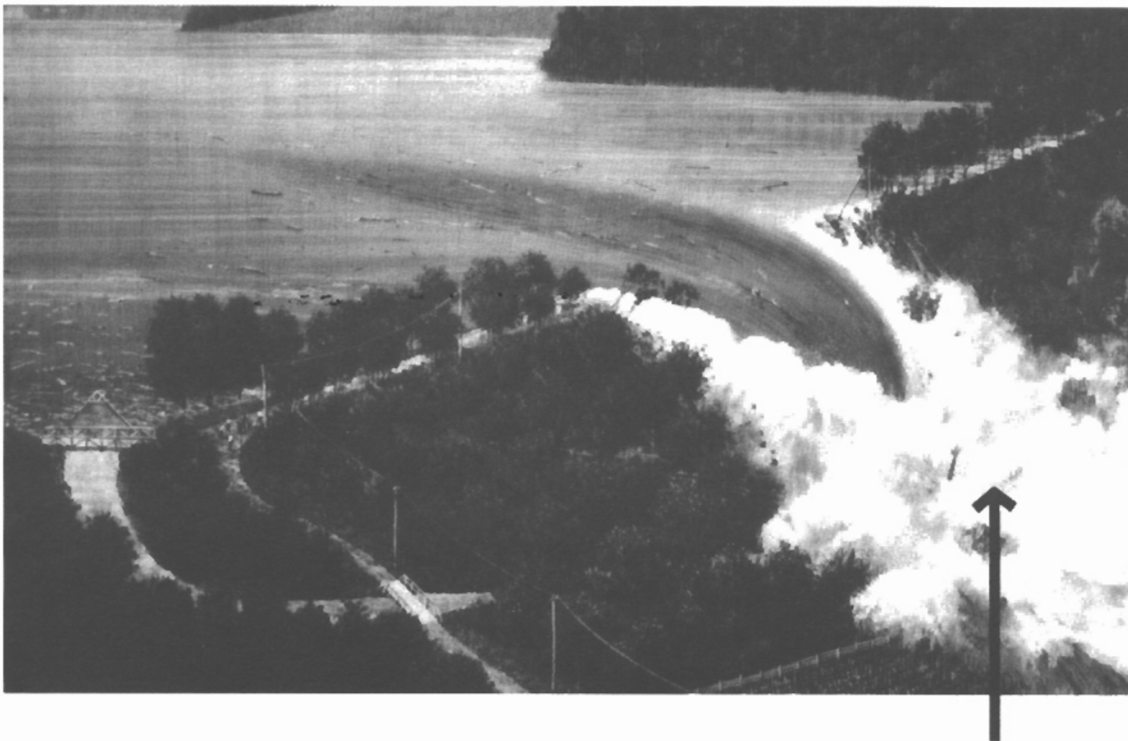
Colonel Unger sent John Parke to South Fork to send a **telegraph** message to warn the people of Johnstown. The roads were in terrible shape because of the storm, but Mr. Parke made the two mile ride in just ten minutes!

8

The core of the original dam was made of **puddled** clay.

When the club repaired the 1862 breach, they filled it in with stone gravel, mud, brush, hemlock boughs, hay, and even horse manure. When this material settled and was compacted by carriage traffic, the dam sagged slightly in the middle. It was at the center that the water began to flow over the top.

At approximately 3:15 in the afternoon, the dam gave way. John Parke would later write, "It is an **erroneous** opinion that the dam burst. It simply moved away." Twenty million tons of water rushed through the breach "roaring like a mighty battle," one eyewitness said. It was as though Niagara Falls thundered into the river valley for thirty-five minutes.



You are here!

# Beyond the Breach

**9** Look downriver and imagine the unleashing of the destructive force that shaved wooded hillsides down to bare rock, snapped huge trees like toothpicks, moved 80-ton railroad locomotives about like toys, and lifted houses from their foundations tossing them about before crushing them.

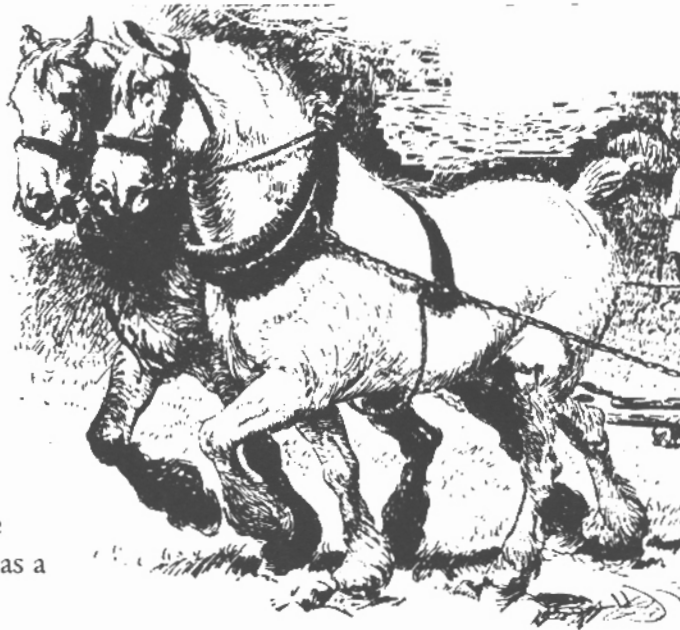
It took the water about an hour to travel the 14 miles of river channel to Johnstown and only 10 minutes to destroy the city.





The large stones you see piled upon the face of the dam give strength and support to the dam and are called **riprap**. They are part of the original dam, which was built by the State of Pennsylvania. Some of the stones were so heavy that it took three teams of horses to move them into place.

Johnstown Flood National Memorial was created by an Act of Congress in 1964 and is administered by the National Park Service. Our mission here is to **commemorate** the Johnstown Flood of 1889 and to preserve for future generations the remnants of the South Fork Dam as a landmark of America's heritage.



# The Dam in Retrospect



The question of who was to blame for the disaster was never satisfactorily answered, and may never be.

The feeling stirred up by newspapers throughout America in 1889 was that the club was indeed responsible and should be held accountable for the shoddy repair job on the dam. The

discharge pipes had not been replaced, the spillway had been obstructed by a fish screen, and the old 1862 breach was filled in with whatever material they could find. People were particularly bitter about the fish screens. A man by the name of Isaac Reed wrote a popular poem which began:

Many thousand human lives—  
Butchered husbands, slaughtered wives,  
Mangled daughters, bleeding sons,  
Hosts of **martyred** little ones,  
(Worse than Herod's awful crime)  
Sent to heaven before their time;  
Lovers burnt and sweethearts drowned,  
Darlings lost but never found!  
All the horrors that hell could wish,  
Such was the price that was paid for—fish!

The club remained silent after the tragedy. They never told *their* story. But we do know that many members of the South Fork Fishing & Hunting Club joined well after the dam had been rebuilt. They paid their dues each year and, apparently, assumed that the dam was being taken care of responsibly.

One engineering study made on the dam after the flood concluded that even had the dam been properly repaired with the **discharge pipes** open and the spillway open to full flow, the **unprecedented** amount of rainfall from the May 30-31 storm was more than the earthen structure could have contained.

We choose not to assign blame. We can only hope to learn from the mistakes made here and profit from them by developing a responsible attitude toward our fellow man and our environment.

# Timeline

of the

## The South Fork Dam

1831	_____	Pennsylvania Mainline Canal completed.
1834	_____	Allegheny Portage Railroad opened.
1839	_____	State of Pennsylvania begins work to dam South Fork of the Little Conemaugh River to provide water for the canal during droughts.
1853	_____	South Fork Dam is completed.
1854	_____	Pennsylvania Railroad completes tracks connecting Philadelphia to Pittsburgh.
1857	_____	State of Pennsylvania sells entire canal system to the Pennsylvania Railroad (including the South Fork Dam).
1862	_____	Stone culvert collapses and South Fork Dam is breached. Pennsylvania Railroad allows lake to drain completely. Cattle and sheep graze in dry lakebed.
1875	_____	Pennsylvania Railroad sells the South Fork Dam to Altoona Congressman Reilley, who removes cast iron discharge pipes and sells them for a profit.
1879	_____	Benjamin Ruff purchases broken South Fork Dam and surrounding property from Congressman Reilley. Under Ruff's leadership the South Fork Fishing & Hunting Club is chartered.
1881	_____	Repairs to the dam are completed.
1887	_____	Benjamin Ruff dies in a Pittsburgh hotel room.
May 30, 1889	_____	The storm begins.
May 31, 1889	_____	The dam fails.

# The Players...

## Emma Ehrenfeld

Telegraph operator at South Fork. She received the message from the lake that the dam was in danger of failing. She was not quite sure what to believe but did send a message down the valley warning of the eminent danger.

## John Parke

Engineer hired by the South Fork Fishing and Hunting Club. John Parke helped Colonel Unger supervise the Italian workers in an attempt to save the dam. Parke rode a horse to the town of South Fork to notify the people and telegraph Johnstown concerning the dangerous condition of the dam.

## Benjamin Ruff

First President and prime promoter of the South Fork Fishing and Hunting Club. Ruff was a railroad tunnel contractor, coke salesman, and real estate broker before organizing the South Fork Fishing and Hunting Club. Although he died years before the Johnstown Flood, he would be blamed for the disaster.

## Elias J. Unger

President of the South Fork Fishing and Hunting Club and caretaker of the South Fork Dam. Elias Unger was the first person on May 31, 1889 to notice that the water level of Lake Conemaugh was dangerously high and threatening to pour over the top of the dam. He organized a group of Italian workers in an effort to save the dam.

## The Storm

The storm had started out of Kansas and Nebraska two days before the Johnstown Flood. The Signal Service called it the most extensive rainfall of the century. Six to eight inches of rain fell in a twenty-four hour period.



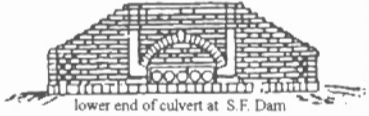
# Glossary

**accountable** responsible or answerable

**breach** an opening made by breaking down something solid; gap. Railroad tracks go through the breach in the old South Fork Dam.

**commemorate** to honor the memory of

**culvert** a drain running under an embankment.



**dam** wall built to hold back the water of a stream, creek, river, etc.

**discharge pipe** a pipe used for releasing water.

**erroneous** mistaken; incorrect; wrong; the erroneous belief that the earth is flat.

**face** the front part.

**gum coat type** of raincoat worn during the 1880's.

**martyr** person who suffers greatly.

**obstructed** blocked up.

**prevalent** widespread.

**puddle** a mixture of water and clay that becomes water resistant.

**reconstruct** construct again; rebuild; make over.

**retrospect** a survey of past time, events, etc. ; thinking of the past. In retrospect means looking back.

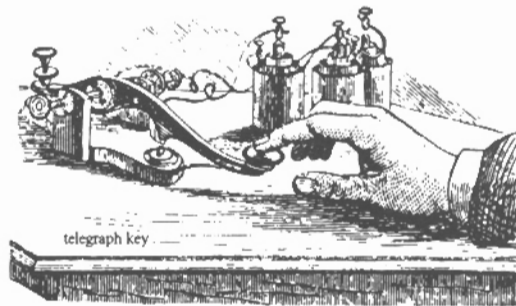
**riprap** large stones piled on the face of the dam to give strength and support

**shoddy** being of poor quality or workmanship.

**sluice** gate that hold backs or controls the flow of water. When the water behind the dam gets too high the sluices are opened.

**spillway** channel or passage for the escape of surplus water from a dam, river, etc.

**telegraph** a means for sending messages by electricity. When you want to telegraph, you give the message to an operator who telegraphs it to a distant city.



**unprecedented** never known before.

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## Test Your Knowledge

1. List in order the four different owners of the South Fork Dam
2. Describe one act of heroism the day the dam broke.
3. List two changes that were made to the design and construction of the dam under the ownership of the South Fork Fishing & Hunting Club that caused many people to blame the club for the tragedy.
4. Identify two important parts of an earthen dam.
5. What will cause any earthen dam to break?